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Mundt

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(54) **DYNAMIC PACKAGING**

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B65D 75/56 (2006.01)
B65D 75/04 (2006.01)

(52) **U.S. Cl.**
CPC ***B65D 75/58*** (2013.01); ***B65D 75/04*** (2013.01); ***B65D 75/566*** (2013.01)

(58) **Field of Classification Search**
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USPC 206/467, 468, 495, 806, 738, 769, 462, 206/470, 736, 751, 756, 759, 461, 463, 206/471, 776, 739, 730, 747, 749, 758, 206/761, 765, 555, 556, 449, 817; 221/52, 56, 198, 226, 227, 279, 557, 271, 221/248, 208, 224, 250
See application file for complete search history.

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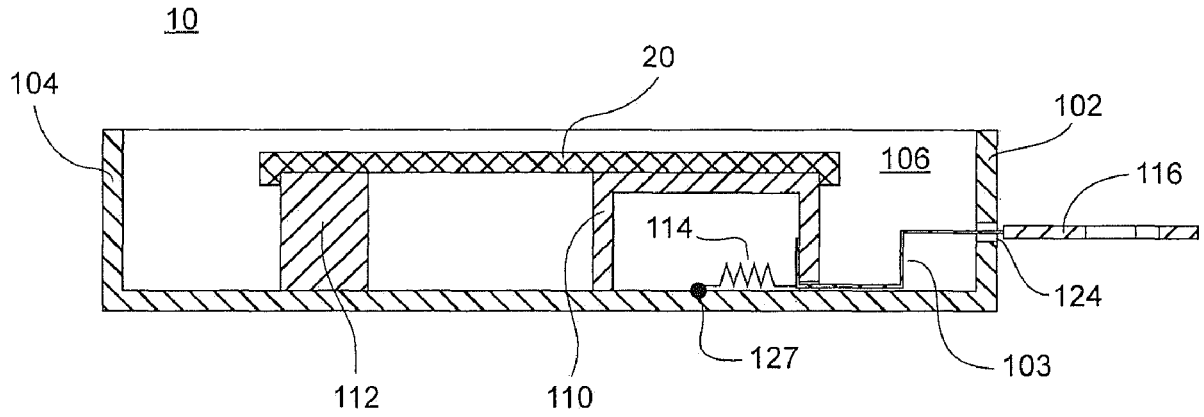
(57) **ABSTRACT**

A package may include a tray configured to receive a product. The product may be retained or positioned in the tray by a fixed anchor and one or more movable anchors. One or more paper springs may be coupled to the movable anchors, and bias the movable anchors in a retention configuration whereby the product is retained or positioned in a first configuration. Upon actuation of the movable anchors, and overcoming the spring force imparted by the paper spring, the product may be released from the packaging.

21 Claims, 9 Drawing Sheets



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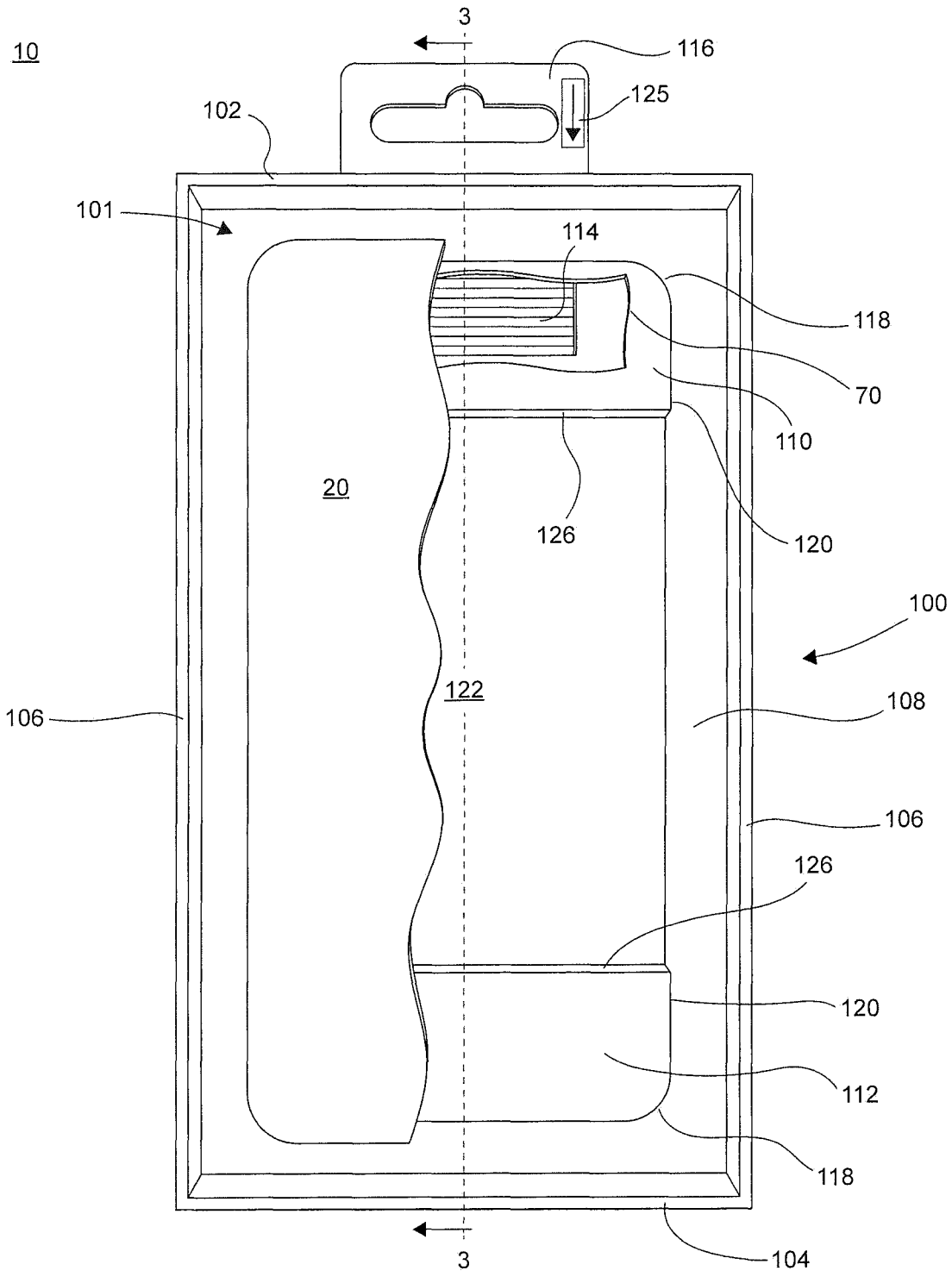
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125
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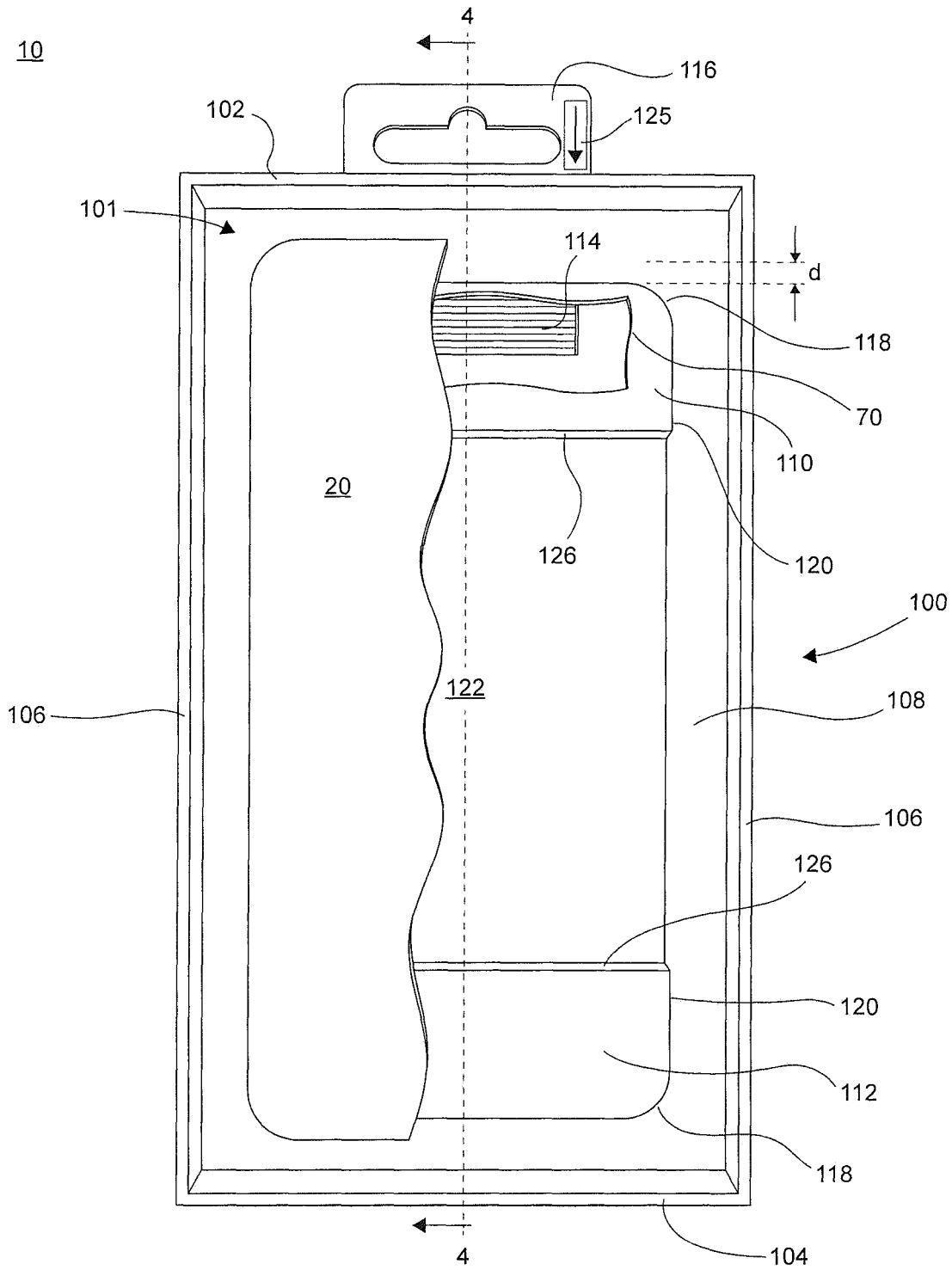
FIG. 1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114
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FIG. 2

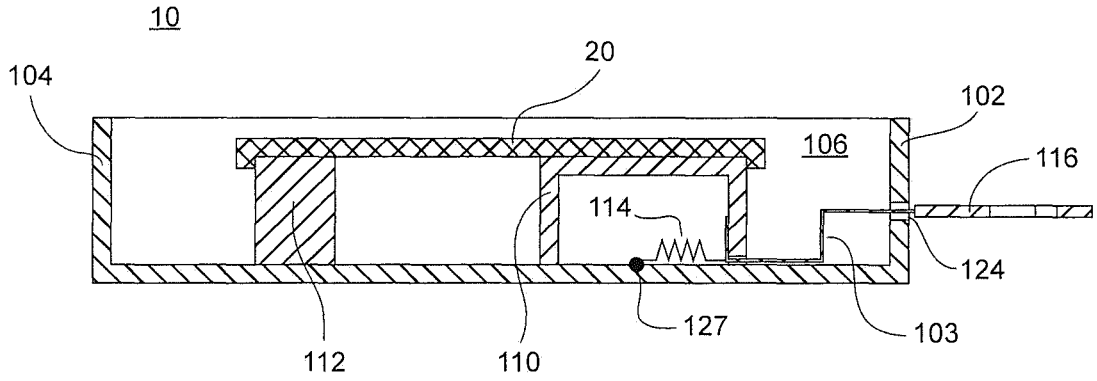
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FIG. 3

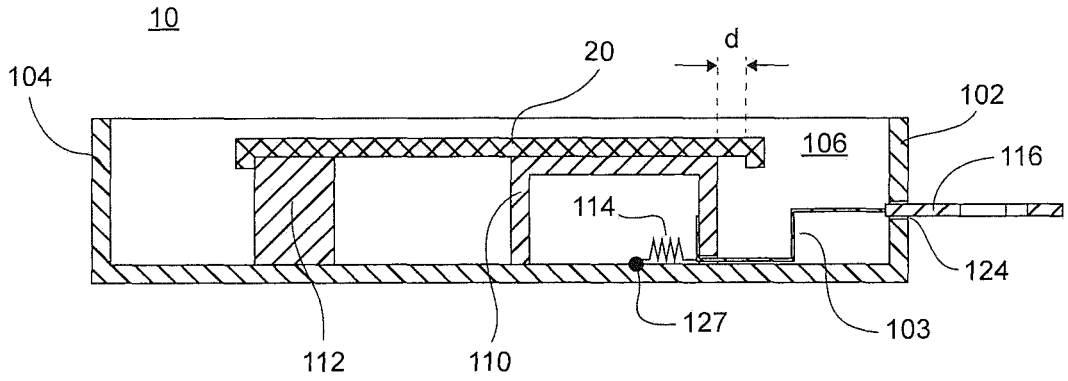
10
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FIG. 4

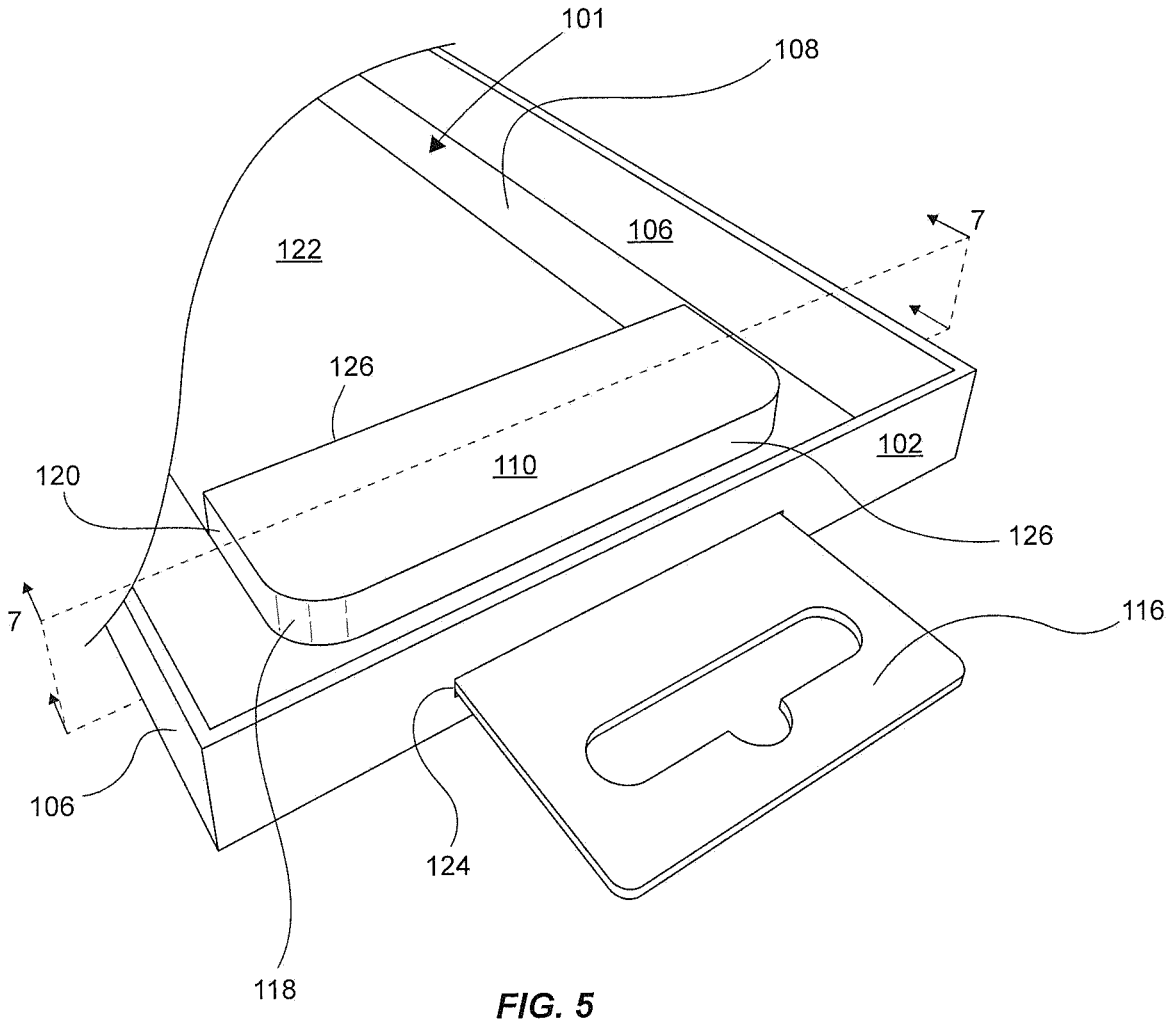


FIG. 5

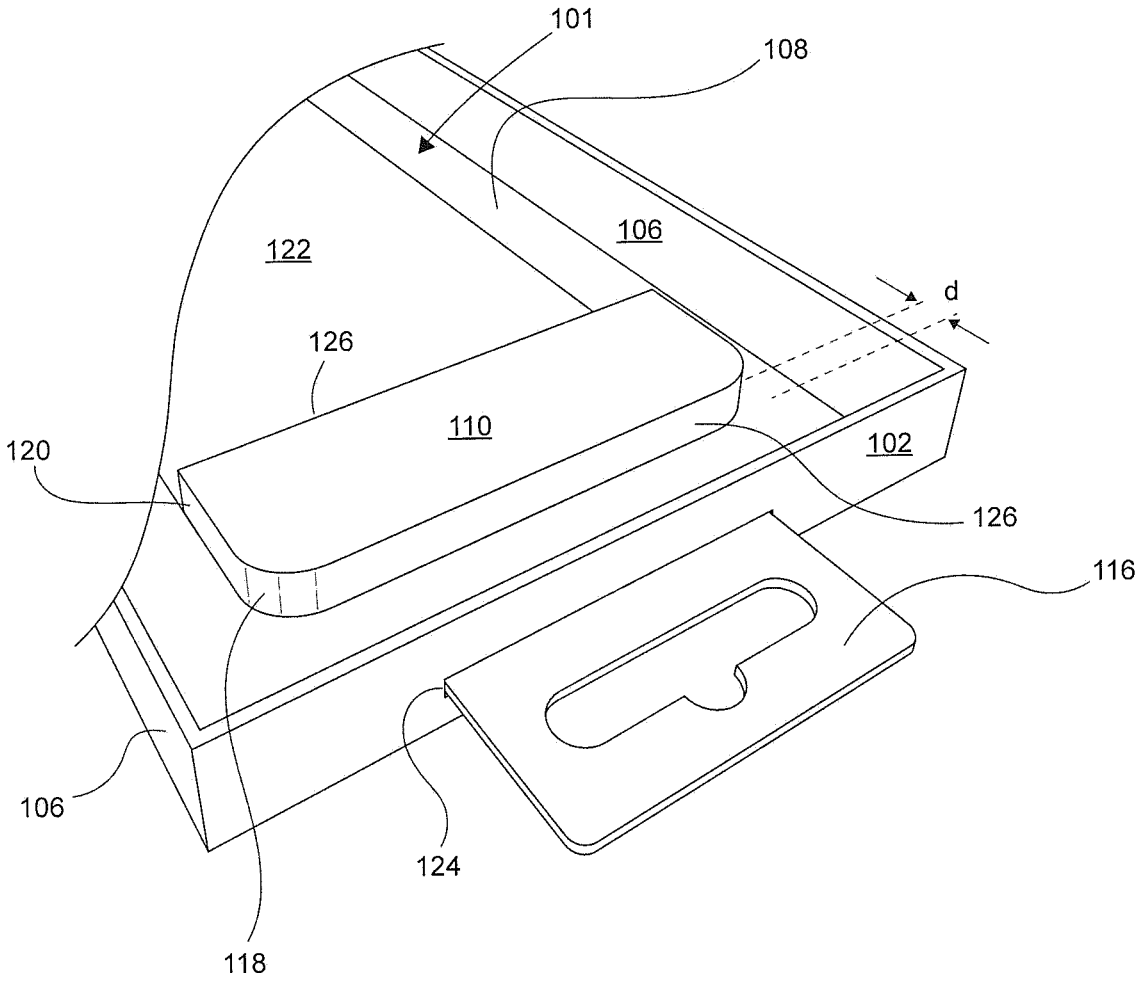


FIG. 6

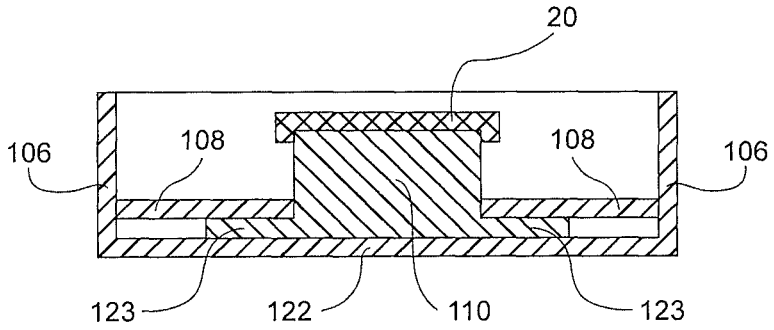
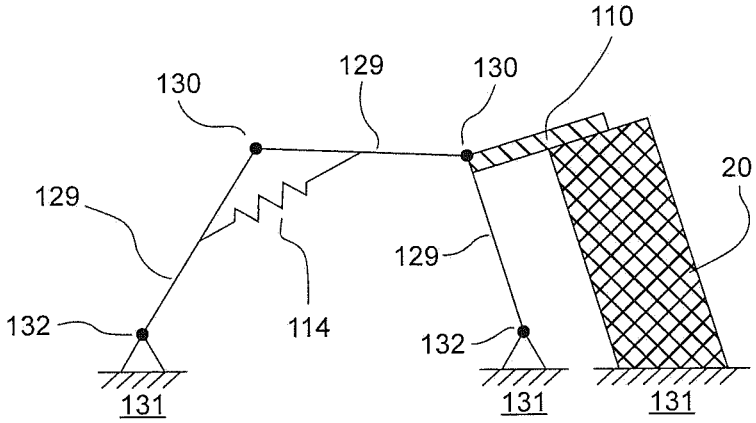


FIG. 7


110
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129
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114
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FIG. 8

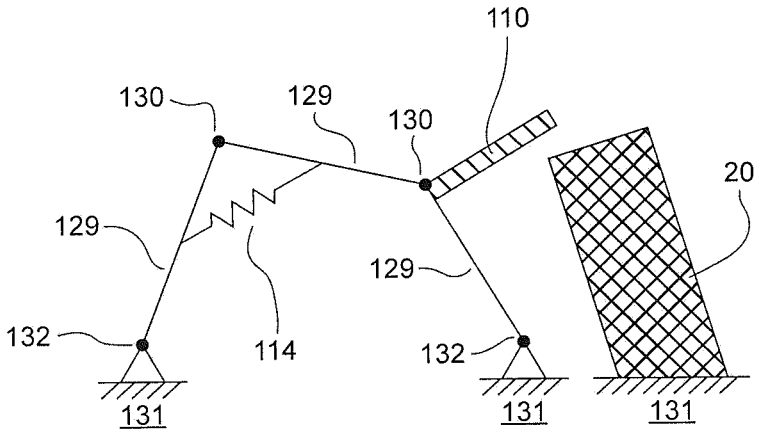
110
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FIG. 9

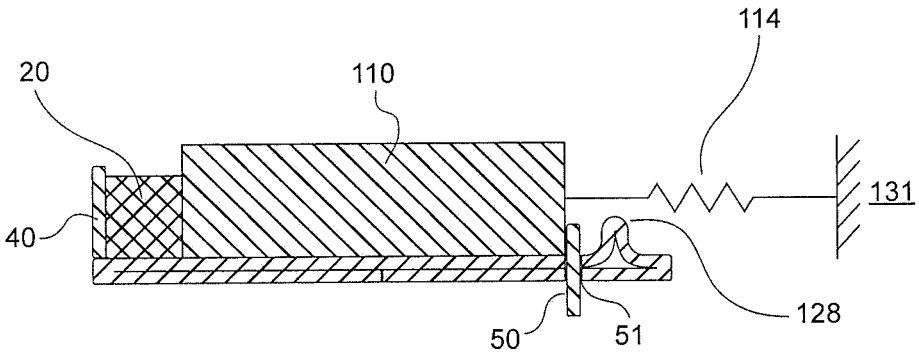

FIG. 10

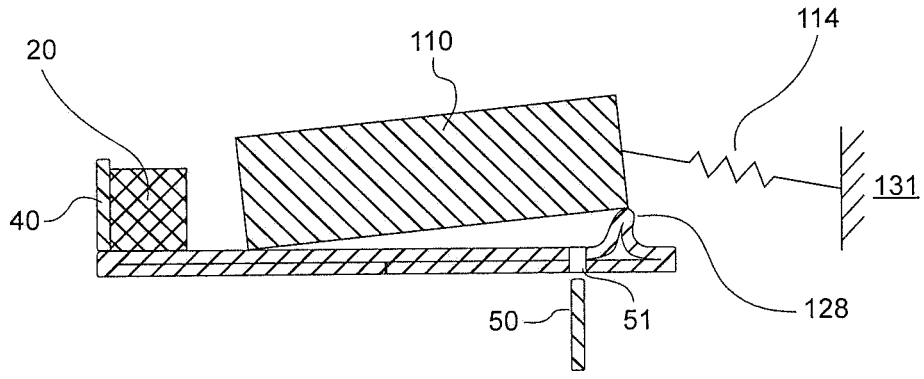

FIG. 11

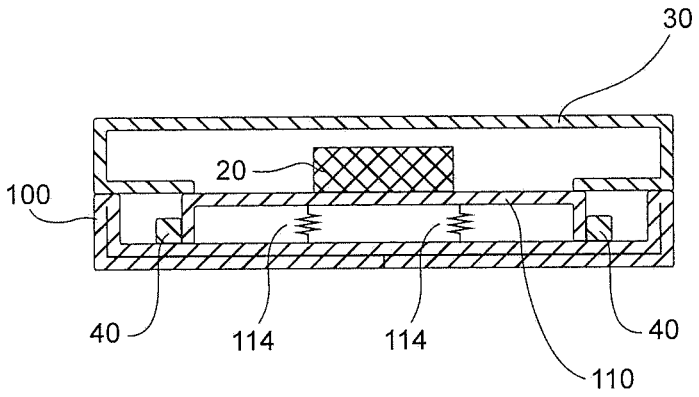

FIG. 12

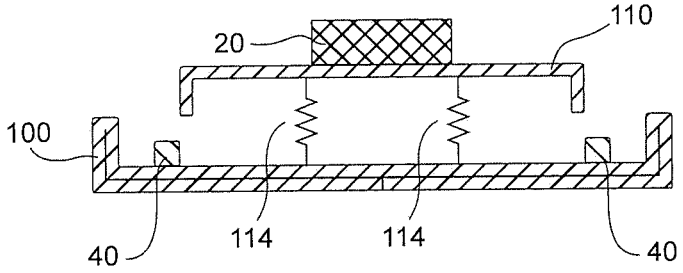

FIG. 13

DYNAMIC PACKAGING

FIELD

The described embodiments relate generally to retail packaging systems and methods. More particularly, the present embodiments relate to dynamic retail packaging for consumer products that may move to dynamically retain, release, or otherwise present the consumer product.

SUMMARY

Some embodiments include a product within retail packaging where the packaging includes a tray to receive the product. The product may be retained using paper-based mechanisms, for example, a fixed anchor and a movable anchor coacting to retain the product. The movable anchor may be biased in a retention configuration by a spring, e.g., a paper spring. In the retention configuration the anchors may engage the product through complementary-shaped surfaces (e.g., surfaces that follow the contour of the product), such that the product is held in place.

The paper spring may be hidden, such that it is invisible to a customer. The actuating mechanism to move the movable anchor may be communicated to the customer through one or more graphics, such that the customer may actuate the movable anchor, either directly or indirectly through an actuating mechanism, to release the product from the packaging. In some embodiments, the paper spring is attached to a surface of the tray, and biases the movable anchor such that the product is held in tension or compression. The paper spring may have a fixed end attached to a surface of the tray, and a dynamic end movable relative to the fixed end. The dynamic end of the paper spring may be attached to the movable anchor, which may be attached to a hang tab extending through an opening in the tray, such that the hang tab is the actuating mechanism to move the movable anchor. The hang tab is the only element a customer needs to interact with in order to release the product from the package in some embodiments.

In some embodiments, one or more components of the packaging are constructed entirely from paper, e.g., a sheet of paper substrate. For example, the tray may be integrally formed from a continuous substrate.

In some embodiments, the paper-based tray includes a movable anchor formed from folded paper, a paper spring coupled to the movable anchor, and a fixed anchor formed from folded paper and fixed to the tray, the movable anchor and fixed anchor together positioning the product within the packaging. In response to a force applied to the movable anchor in a direction away from the product and against a biasing force of the paper spring, the product is released to be removable from the packaging. One or more of the anchors may be disposed on a bottom surface of the tray.

In some embodiments, a hang tab is attached to an end of the movable anchor or paper spring opposite the movable anchor and through an opening in the tray. In some embodiments, the hang tab may be unitary, with the movable anchor or paper spring. In response to a force pushing the hang tab towards the tray the movable anchor moves against a force of the paper spring, such that the product is released. The opening may be disposed in a sidewall of the tray extending perpendicularly from the bottom surface.

The movable anchor may be a folded paper component. In some embodiments, the movable anchor is hollow, and the paper spring is disposed therein. In this way, the paper spring may be hidden from the customer opening the packaging.

In some embodiments, the fixed anchor and movable anchor together provide one or more of a tensile, compressive, or torsional force on the product. This may be a retention force on the product, retaining it in a particular position within the packaging. One or more of the anchors may include a surface shaped to engage a complementary-shaped surface of the product in a retention configuration. In some embodiments, the fixed and movable anchors are spaced equidistantly from terminal ends of the tray in a retention configuration.

One or more of the tray, anchors, or paper spring is constructed entirely from paper, in some embodiments, and is completely recyclable. In some embodiments, each of the tray, anchors, and paper spring is constructed entirely from paper. The movable anchor may be integrally formed from a continuous substrate. In some embodiments, the paper spring is integrally formed from a continuous substrate, for example, folded in a v-shape, or repeating v-shape in an accordion or zig-zag fashion.

The packaging or product may include a graphic indication on an exterior surface of the packaging to indicate how the movable anchor may be actuated to release the product from the packaging.

The tray may be formed entirely from paper, and include a bottom surface and sidewalls coupled to edges of the bottom surface. In this configuration, the sidewalls and bottom surface define a rectangular cuboid cavity. The fixed anchor and movable anchor may be configured to engage a product when the packaging is closed, and configured to release the product when the packaging is opened. The paper spring may be configured to bias the movable anchor such that the product is retained by the force produced by the spring between the fixed anchor and movable anchor acting together. As above, the paper spring is hidden from view when the tray is assembled, and the actuating mechanism may be actuated by a component on the exterior of the tray or packaging.

In some embodiments, the tray includes a bottom surface for receiving a product. The tray may include first and second sidewalls corresponding to the top and bottom of the packaging when the packaging is hung from a hang tab disposed on or proximate the first sidewall. The tray may include third and fourth sidewalls, for example, perpendicular to the first and second sidewalls. The tray may be substantially rigid (e.g., resistant to bending or twisting, such that when the paper mechanism is actuated the tray does not deform.)

The tray or other components of the packaging may be formed from a single sheet of material (e.g., a blank). In some embodiments, the blank is folded such that the tabs, flaps, and regions without adhesive are folded such that no adhesive is visible in a finished configuration. Additionally or alternatively, adhesive may be omitted from some or all of the regions, and the various flaps and tabs attached in another suitable manner (e.g., by mechanical interlocks between tabs and slots). An interior edge of the blank may fold inward, such that when folded over there is no raw edge on the outside of the packaging. Additional panels may be folded onto each other to eliminate raw edges on various surfaces of the packaging. Individual blank sections may be folded onto one another, for example to create the features of the packaging, including the movable anchor and paper spring.

BRIEF DESCRIPTION OF THE DRAWINGS

The disclosure will be readily understood by the following detailed description in conjunction with the accompa-

nying drawings, wherein like reference numerals designate like structural elements, and in which:

FIG. **1** shows a top perspective view of packaging in a first configuration.

FIG. **2** shows a top perspective view of packaging shown in FIG. **1** in a second configuration.

FIG. **3** shows a cut-away view schematic illustration of the packaging taken along line **3** in FIG. **1**.

FIG. **4** shows a cut-away view schematic illustration of the packaging taken along line **4** in FIG. **2**.

FIG. **5** shows an enlarged perspective view of the packaging shown in FIG. **1**.

FIG. **6** shows an enlarged perspective view of the packaging shown in FIG. **2**.

FIG. **7** shows a cut-away view schematic illustration of the packaging taken along plane **7** in FIG. **5**.

FIGS. **8** and **9** show schematic illustrations of packaging in various positions.

FIGS. **10** and **11** show schematic illustrations of packaging in various positions.

FIGS. **12** and **13** show schematic illustrations of packaging in various positions.

DETAILED DESCRIPTION

Product packaging is an integral part of a customer's experience. It introduces the customer to their product, and can affect the customer's feelings toward the product and the company that created it. Dynamic packaging—packaging that engages a user through deliberate movement or mechanisms similarly may engage a customer. Additionally, dynamic packaging may be used, for example, to adjust for material or component tolerances to position, retain, or lock products into place within the packaging, and can be used as cushioning elements to protect against damage during shipping or when in a retail environment.

Packaging that achieves this dynamic, aesthetically pleasing packaging made from eco-friendly materials—is particularly desirable.

Packaging described in this document achieves this by starting with paper based materials. The product is supported or retained in position within the packaging by a paper-based mechanism. A paper spring is included in the mechanism, which results in a supporting or retaining force being applied to the product. The customer, through intuition or graphical instructions, interacts with the packaging to release the paper-based mechanism including the paper spring. The product then can be simply removed from the packaging, without damaging or destroying the packaging (which may result from packaging including tape or adhesive closures or tear strips/pull tabs). This is advantageous, because customers may want to inspect products in-store prior to purchase. With some packaging, if a customer opens it, the packaging may become damaged, such that that particular unit cannot be reshelved. The store may incur higher costs, due to obtaining new packaging or products (e.g., factory-sealed packaging).

The non-destructive nature of the packaging disclosed herein allows a customer to release the product within a store and interact with the product prior to purchase without requiring the customer to go through the trouble of moving ties, flaps, or other retention mechanisms. Further, this packaging may be repeatedly opened in-store—multiple potential customers may remove and replace the product when evaluating a purchase in-store, without affecting the packaging. Further, in situations where a product is directly sent to a customer, this results in an enhanced unboxing experience, since the product can be easily removed, and—if desired—the customer can keep the packaging to store the product. If and when the customer opts to dispose of the packaging, because the entire packaging (including the spring and movement mechanisms) is paper-based, the packaging may simply be recycled without requiring material separation (e.g., in a single-stream recycling program). The entirety of the packaging may be made from paper—the only non-paper element in the packaging may be the product.

Packaging for consumer products may be an important marketing tool used to attract and retain customers. Packaging should be aesthetically appealing, but at the same time direct a customer's attention to the product it is designed to hold. Packaging having defects or imperfections can draw the customer's attention away from the product it is holding or make the product seem less appealing. Optimization of packaging may promote a positive user experience. Packaging made out of recyclable and/or biodegradable materials, such as paper or paper-based products can reduce environmental impact. Packaging that is interesting in character and well-executed may boost a product's or a brand's reputation, thereby attracting new customers and retaining previous customers.

The packaging described herein may be used to hold and ship items, such as, for example, consumer products. The packaging may be retail packaging (i.e., finished packaging for containing and conveying a product to a user such as may be used in a retail setting, not shipping packaging for containing a packaged product during shipment) that one may expect to find on the shelf in a retail store, and which one may open to directly access their product. The product may be, for example, an electronic device (e.g., a laptop, tablet computer, or smartphone) or it may be a non-electronic device (e.g., a case for an electronic device, or book). In some embodiments, the packaging may be configured to allow a customer to release the product within a store, to interact with the product prior to purchase.

These and other embodiments are discussed below with reference to the figures. However, those skilled in the art will readily appreciate that the detailed description given herein with respect to these figures is for explanatory purposes only and should not be construed as limiting.

Packaging **10** is shown in FIGS. **1-4**. FIGS. **1** and **2** are top and bottom perspective views of packaging **10**. As shown, packaging **10** includes a tray **100**, supporting or retaining a product **20**. As shown, product **20** may be a case, e.g., for an electronic device such as a mobile phone. As depicted, product **20** is shown broken away, to view components underneath it during use. In some embodiments, packaging **10** includes a lid, which contains product **20** between tray **100** and the lid when packaging **10** is closed. Tray **100** includes a first wall **102** and a second wall **104**, disposed across from one another and extending substantially vertically from a bottom surface **108** of tray **100**. In some embodiments, sidewalls **106** are included and extend from both first wall **102** and second wall **104**, forming a generally rectangular cuboid-shaped cavity **101**. Other shapes of tray **100**, the lid, and packaging **10** in general are contemplated.

As shown, tray **100** may include a movable anchor **110** and a fixed anchor **112**, such that a distance between the anchors is adjustable. In some embodiments, anchors may be separate components, as shown in the figures. In other embodiments, one or more of the anchors may be other features of tray **100**, such as the bottom surface or sidewalls.

Tray **100** has a first configuration shown in FIG. **1**, and second configuration shown in FIG. **2**, showing movable

anchor **110** and fixed anchor **112** and their relative positions. The relative positions may be achieved through actuation of a mechanism, including a paper spring **114** (shown within broken region **70**). Broken region **70** is shown to illustrate paper spring **114** within movable anchor **110**, and may not actually be an open surface on movable anchor **110**. In some embodiments, broken region **70** may be configured as a window or opening, such that paper spring **114** is visible inside movable anchor **110**. As shown, paper spring **114** is connected to a bottom surface **108** of tray **100**, and may engage movable anchor **110** on one end. Movable anchor **110** or paper spring **114** is connected to a hang tab **116** on a dynamic end opposite from the static end of paper spring **114** to bottom surface **108**, such that motion of movable anchor **110** and paper spring **114** can be influenced by motion of movable anchor **110** or hang tab **116**.

In general terms, paper spring **114** and movable anchor **110** are movable between a first position and a second position. The second position may be further from the paper spring's **114** neutral position than the first position such that the spring force is greater in the second position. In some embodiments, paper spring **114** and movable anchor **110** move automatically from the second position to the first position upon removal of a force maintaining paper spring **114** and movable anchor **110** in the first position. In some embodiments, packaging **10** retains product **20** within packaging **20** when in the first position, and releases product **20** when in the second position. In some embodiments, motion from the second position to the first position may be actuated by removal of a component of packaging **10** that is blocking such movement (see, e.g., actuator **50** in FIGS. **10** and **11**).

In some embodiments, paper spring **114** may be connected solely to a bottom surface **108** of tray **100**, such that a dynamic end of paper spring **114** is freely floating, and engages movable anchor **110** without directly connecting to it. In this regard, assembly of finished packaging **10** is simplified, such that only one end of paper spring **114** need be directly affixed to a surface of packaging **10**, such as through adhesive, tape, or other securing means. The compressive spring force of the spring pressing against movable anchor **110** and its secured end at packaging **10** creates the movement required to engage product **20**. In some embodiments, a portion of movable anchor **110** may be fixed, such that no end of paper spring **114** need be directly attached. In some embodiments, paper spring **114** may be coupled to and engage multiple movable anchors. In some embodiments, paper spring **114** may engage no fixed anchors, and may be attached to no fixed surface.

Paper spring **114** may be hidden from view, e.g., where top surface of movable anchor **110** may be closed, hiding paper spring **114**. Paper spring **114** may be formed as a separate component, or may be integrated with, for example, movable anchor **110**. In some embodiments, paper spring may be formed integrally with tray **100**, e.g., from a portion of the bottom surface **108**.

As shown, a portion of paper spring **114** may engage movable anchor **110** such that it is movable to disengage a surface of a product (as shown in schematic cross-sectional views of FIGS. **3** and **4**). Advantageously, this improves upon prior systems having solely static, fixed anchors, where excess product, assembly, or packaging tolerance issues result in either products being too difficult to remove from the packaging, or not be securely retained within the packaging. This is because paper spring **114** may be configured to have a range of motion through which it will have a sufficient force to retain product **20**, and that range of motion is sized to be much greater than typical retention tolerances in a fixed packaging. Dimensional tolerances on product **20**, combined with dimensional tolerances on packaging **10**, are absorbed and accommodated through the range of motion of paper spring **114**.

In some embodiments, paper spring **114** may act as a shock absorber, absorbing movement such as that due to shock loading in shipment, or the like. Paper spring **114** may augment, or replace, certain shock absorbing materials, such as knit spacers, foams, etc., due to the dynamic tolerance the paper spring provides packaging **10**. Paper spring **114** may thereby prevent damage to product **20** during shipment, for example, or if a customer drops packaging **10** in-store, prior to purchase.

Comparing FIGS. **1** and **2**, hang tab **116** and movable anchor **110** (or paper spring **114**), coupled together, are actuated and displace movable anchor **110** towards fixed anchor **112** by a distance "d" (as shown in FIGS. **2** and **6**). This allows product **20** to disengage and be released from packaging **10**, and allows a customer to remove product **20** from the packaging **10**. An exemplary cross-sectional schematic illustration of this process is shown in FIGS. **3** and **4**, showing how product **20** may be held.

In some embodiments, product **20** may be a case, e.g. a mobile phone case or other electronic device case. In these embodiments, anchors **110** and **112** engage opposing inner walls or edges of the case. As the distance between anchors **110** and **112** decreases through the actuation of the mechanism, the movable anchor **110** will disengage the inner wall or edges on that side, and release product **20**. In other embodiments, product **20** may be held between anchors **110** and **112**, where in order to release product **20**, the distance between anchors **110** and **112** are increased through actuation of the mechanism. Rounded surface **118** may be shaped to engage the interior contour of a mobile phone case, for example, such that movable anchor **110** coacts with fixed anchor **110** to provide tensile force on an interior contour of the case in a product retention configuration. In some embodiments, the contour may be reversed, e.g., when spring **114** is configured to provide compression between anchors **110** and **112**, such as end caps for a mobile phone.

In some embodiments, packaging **10** may include a graphic **125** that indicates that the hang tab **116** should be moved in a particular direction. For example, graphic **125** could be placed on first wall **102**, proximate opening **124**, indicating that hang tab **116** should be moved in a particular direction (e.g., pressed towards opening **124**). In some embodiments, graphic **125** could be placed directly on hang tab **116**, or sidewall **106**. In some embodiments, multiple graphics may be included, and may be different depending on their location about packaging **10**. The graphic may include an arrow, or schematic illustration of the paper mechanism releasing product **20**, in order to communicate to the customer the existence of the paper mechanism. As above, in some embodiments, paper spring **114** is hidden such that the customer cannot tell that the actuating mechanism is a paper spring.

Paper spring **114** may be configured as a compression spring, as shown in the figure, and may simply be a paper-based element that is folded onto itself repeatedly in an "accordion" or "zig-zag" fashion. In other embodiments, paper spring **114** may be an extension spring, torsion spring, constant force spring, Belleville spring, spring clip, natural spring, leaf spring or other type of spring. In some embodiments, paper spring **114** may be made from a higher grammage paper than other components (e. g., elements of tray **100** such as the sidewalls, anchors **110** and **112**, or a lid and sleeve), of the packaging **10**.

Turning to FIGS. **3-4**, schematic cross-sections are shown of packaging **10**, showing the releasing of product **20** based on the movement of the paper-based mechanism in a first configuration retaining product **20** (FIG. **3**) and a second configuration releasing product **20** (FIG. **4**). As shown, paper spring **114** may be a compression spring. Hang tab **116** may be connected to movable anchor **110** or paper spring **114** through an intermediate member **103**. Within movable anchor **110**, paper spring **114** may be secured to tray **100** (e.g., at lower surface **122**, through adhesive **127**). Due to the compressive nature of paper spring **114**, movable anchor **110** may be biased towards hang tab **116**, which connects to paper spring **114** at a dynamic end (through movable anchor **110**), and passes through opening **124** of tray **100**.

In the first configuration (FIG. **3**) product **20** is subjected to a tensile force between fixed anchor **112** and movable anchor **110**. This allows for more relaxed tolerances in dimensions of product **20** and packaging **10**, because potential gaps or variations among the dimensions of different products **20** are accounted for in the tensile force applied to the product. In some embodiments, depending on the features and nature of product **20**, compressive or torsional forces may be imparted by paper spring **114**, depending on the construction of the mechanism. As shown in FIG. **4**, product **20** may be released, due to the distance between anchors **110** and **112** decreasing, allowing product **20** to be removed from packaging **10**.

Turning to FIGS. **5** and **6**, a portion of a perspective view of tray **100** is shown. As shown, first wall **102** includes opening **124** through which paper spring **114** or movable anchor **110** and hang tab **116** may be connected. In this way, the inner workings of the paper-based mechanism may be hidden from view from the customer. As shown, movable anchor **110** (and similarly fixed anchor **112**) may include rounded surface **118**, e.g., to engage a surface of product **20**. Anchors **110** and **112** may each have opposing inner edges **126**, e.g., which do not engage a surface of product **20** in any configuration.

A schematic cross-section is shown of packaging **10** in FIG. **7**. In some embodiments, movable anchor **110** may be disposed such that a portion of its structure is between the layers of lower surface **122** and bottom surface **108** of the tray, such that there is a track formed between the two layers that is hidden from view during use. In this way, movable anchor **110** may be guided along the edges of lower surface **122** along a track element created by the layering of bottom surface **108** on top of lower surface **122**. Movable anchor may include elements that are configured to slide along the track, such as wings **123**. In this way, the inner working mechanism is hidden from the customer, and only through pushing hang tab **116** down along a longitudinal access of the tray **100** will the movable anchor **110** be visibly moved. This clean aesthetic contributes to the high-end feeling of this packaging, and keeps exposed movable components to a minimum. In some embodiments, anchors **110** or **112** may be configured to project into or through a detent, indentation, hole, or other feature of a product, such as a watch band adjustment hole, for example.

Turning to FIGS. **8** and **9**, another embodiment of a paper-based mechanism is shown, including paper spring **114** with movable anchor **110**. As shown, the paper based mechanism may be a linkage, e.g., a three- or four-bar linkage. One or more of the links **129** may be made from paper. The mechanism may include a paper hinge **130**, or paper damper or paper isolator for example. The linkage may be directly actuated by a customer, for example by pressing on or pulling one of the links **129** or anchor **110**.

As shown, in a first configuration (FIG. **8**), the links of the linkage may be positioned such that movable anchor **110** engages product **20**. In another configuration (FIG. **9**), the linkage may be actuated—at one or more of the links or at anchor **110** itself—such that movable anchor **110** disengages the product **20**. As shown in the figure, the product **20** may simply be held in position through the interaction with movable anchor **110** and a mechanically grounded surface **131**, such as any surface of tray **100**.

In other embodiments, the linkage may be indirectly actuated, e.g., through simply opening the package or interacting with an ancillary packaging structure, which may release the mechanism from a constrained position. As with other embodiments, depending on the features and nature of product **20**, tensile, compressive, or torsional forces may be imparted by paper spring **114**, depending on the construction of the mechanism. In this regard, additional movement and customer engagement is possible, such that a dynamic packaging is further emphasized. In some embodiments, paper spring **114** provides a constant force on product **20**. In other embodiments, the force provided by paper spring **114** may vary, e.g., according to position of movable anchor **110**.

As shown in FIGS. **10** and **11**, another embodiment of a paper-based mechanism is shown, including paper spring **114** with movable anchor **110**. As shown, in one configuration (FIG. **10**), movable anchor **110** may engage product **20**, with support member **40** providing a stationary surface to hold product **20**. In some embodiments, packaging **10** includes actuator **50**, which is placed in a holding portion **51** (e.g., a hole in tray **100**) in a first configuration, preventing spring **114** from pulling movable anchor **110**.

In a second configuration (FIG. **11**), paper spring **114** may move movable anchor **110** across a rib **128**. This action may produce an audible or haptic feedback signal, such as a pop or click. In some embodiments, movable anchor **110** may release product **20** through action of paper spring **114**, wherein the audible or haptic feedback signal serves as an indication to the customer that the product **20** is now released, free to be removed from packaging **10**. As shown, rib **128** may deflect through interaction with movable anchor **110**, producing the feedback indication.

In some embodiments, rib **128** may be actuated by a component other than movable anchor **110**, such as an ancillary component of packaging **10**, such as actuator **50** being removed from holding portion **51**. In this way, a separate component may be configured to release the mechanism, and allow paper spring **114** to move movable anchor **110**. For example, rib **128** may be actuated by a lid or sleeve of packaging **10**, such as when a customer frees tray **100** from a lid or sleeve.

Turning to FIGS. **12** and **13**, a raising platform embodiment is shown, whereby paper spring **114** lifts platform-based movable anchor **110**. As shown, in some embodiments, multiple paper springs **114** may be used. In some embodiments, paper springs **114** may provide force in a single direction. In some embodiments, paper springs **114** may provide force in different or opposing directions. In some embodiments the magnitude of force applied through each spring is different (e.g., they have different spring constants). Support members **40** may locate movable anchor **110**. In some embodiments, support members **40** may be configured as a collar, surrounding in whole or in part movable anchor **110**. As shown, packaging **10** may include lid **30**, disposed above tray **100**. Lid **30** and tray **100** house product **20**. In some embodiments, lid **30** may engage and retain movable anchor **110** in a first configuration (when the packaging **10** is closed, for example, as shown in FIG. **12**).

As shown in the second configuration (FIG. **13**), when lid **30** is removed, packaging **10** may adjust to a second configuration, whereby paper spring **114** raises movable anchor **110**, and in turn raising product **20** above tray **100**. In some embodiments, movable anchor **110** may interact with ribs as described above, for example, disposed on support members **40**, to produce an audible or haptic feedback that indicates that the product is ready to be removed from packaging **10**. In some embodiments, paper spring **114** may be configured to absorb movement, such as shock loading in shipment, or the like.

Packaging **10** has been referenced in some embodiments including a lid, however a lid may be omitted, or a different closure element included, such as a sleeve. In some embodiments, a customer may remove product **20** from tray **100** to inspect product **20** without damaging packaging **10**. This is in contrast to packaging having adhesive, tape, etc., that inhibit their opening and that may result in changed or damaged packaging upon overcoming the inhibition and opening the packaging.

Components of packaging **10** may be formed from one or more blanks. In some embodiments, the blank is formed of a single continuous substrate, such as, for example paper or a paper-based material like cardboard or paperboard. In some embodiments, interior surfaces of the blank may be surface treated or coated, for example with a coating to protect the finished component such as tray **100**, or product **20**. Tabs, flaps, and regions without adhesive of the blank are folded such that no adhesive is visible in finished packaging **10**. In some embodiments, adhesive may be omitted and the various flaps and tabs attached in another suitable manner. Fold lines may be formed, for example, by weakening the substrate along the lines, such as by perforation, material crushing, scoring, miter cutting, etc.

Packaging **10** is constructed to give a clean, unitary appearance. This helps to reinforce its high quality and robust character, and that of the product **20**. To achieve this appearance, seams, gaps, and raw material edges are minimized (raw material edges are edges formed by cutting through a flat material, where the substance of the material between its outer flat surfaces is revealed). In some embodiments, components of the packaging may be folded from one or more sheets, such that when folded over and adhered together there is no raw edge on the outside of the component or packaging **10**. As shown in the figures, panels may be folded onto each other to eliminate raw edges on various surfaces of tray **100** or other packaging **10** components. In some embodiments, components of packaging **10** may be constructed with multiple blanks.

In some embodiments, any surface finishing may take place after the components are cut from the blank, or alternatively prior to the blank being cut into separate sheets for assembling to a final product. Additionally, some operations may be performed concurrently.

The packaging components may be composed of a recyclable material (e.g., a biodegradable or compostable material). For example, each of the packaging components may be formed of paper-based materials (e.g., material formed of dried cellulose pulp), such as, for example, paperboard. Each of tray **100**, anchors **110** and **112**, and spring **114** may be formed from folded paperboard (e.g., greyboard cardboard or solid bleached sulfate (SBS)).

Alternatively, some or all of the components described as being formed of paper may instead be formed of a polymeric material. Suitable polymeric materials include, but are not limited to, polyethylene, polypropylene, polyurethane, polystyrene, polymer blends including one or more of these polymers, or co-polymers including one or more of these polymers. All or some of the surfaces of the packaging (including the paper spring) may be coated, or laminated, which may increase structural strength properties such as rigidity and which may protect a product within the packaging, or avoid scratching. The paper spring could also be replaced with a different type of spring, e.g., a silicone spring, or raw rubber spring, for example, or a metallic spring.

Additionally, the packaging may be manufactured in a cost-effective and environmentally-friendly way. In some embodiments, the packaging components may be constructed of a single integrally-formed piece of material. The single integrally-formed piece of material may be a foldable material that is folded into a configuration that holds and secures a product, either alone or within a cavity of a packaging container. In some embodiments, the foldable material may be a single piece of material that is cut by a single operation (e.g., a single die cutting operation). In some embodiments, the foldable material may be die cut from a stock material (e.g., a sheet or roll of material). Single integrally-formed pieces of material that are cut by a single cutting operation may facilitate efficient and reproducible manufacturing. Moreover, such manufacturing may reduce waste by reducing waste material during manufacturing.

The foregoing description, for purposes of explanation, used specific nomenclature to provide a thorough understanding of the described embodiments. However, it will be apparent to one skilled in the art that the specific details are not required in order to practice the described embodiments. Thus, the foregoing descriptions of the specific embodiments described herein are presented for purposes of illustration and description. They are not targeted to be exhaustive or to limit the embodiments to the precise forms disclosed. It will be apparent to one of ordinary skill in the art that many modifications and variations are possible in view of the above teachings.

It will be apparent to one of ordinary skill in the art that many modifications and variations are possible in view of the above teachings, and that by applying knowledge within the skill of the art, one may readily modify and/or adapt for various applications such specific embodiments, without undue experimentation, without departing from the general concept of the present invention. Such adaptations and modifications are intended to be within the meaning and range of equivalents of the disclosed embodiments, based on the teaching and guidance presented herein.

The Detailed Description section is intended to be used to interpret the claims. The Summary and Abstract sections may set forth one or more but not all exemplary embodiments of the present invention as contemplated by the inventor(s), and thus, are not intended to limit the present invention and the claims.

The present invention has been described above with the aid of functional building anchors illustrating the implementation of specified functions and relationships thereof. The boundaries of these functional building anchors have been arbitrarily defined herein for the convenience of the description. Alternate boundaries can be defined so long as the specified functions and relationships thereof are appropriately performed.

The phraseology or terminology used herein is for the purpose of description and not limitation, such that the terminology or phraseology of the present specification is to be interpreted by the skilled artisan.

The breadth and scope of the present invention should not be limited by any of the above-described exemplary embodiments, but should be defined in accordance with the claims and their equivalents.

What is claimed is:

1. A product with packaging, comprising:

a product;

a tray, comprising:

a movable anchor comprising folded paper;

a paper spring coupled to the movable anchor; and

a fixed anchor comprising folded paper and fixed to the tray,

wherein the movable anchor and fixed anchor together retain the product in position relative to the packaging under force applied by the paper spring, and

wherein in response to a force moving the movable anchor relative to the product and against a biasing force of the paper spring, the product is released and removable from the packaging.

2. The product with packaging of claim **1**, wherein the product is replaceable after its removal, with no destruction of any part of the packaging.

3. Packaging, comprising:

a bottom surface;

a fixed anchor disposed on the bottom surface;

a movable anchor disposed on the bottom surface, the movable anchor movable linearly toward and away from the fixed anchor; and

a paper spring attached to the bottom surface and coupled to the movable anchor and biasing the movable anchor toward or away from the fixed anchor;

wherein the packaging is configured to retain a product under a retention force applied to the product by the bias of the paper spring on the movable anchor, and

wherein in response to a force overcoming the bias the movable anchor moves relative to the fixed anchor to release the product.

4. The packaging of claim **3**, further comprising a movable hang tab coupled to the movable anchor and extending through an opening in the packaging, wherein a force moving the hang tab relative to the packaging also moves the movable anchor.

5. The packaging of claim **4**, wherein the opening is disposed in a sidewall of the packaging extending perpendicularly from the bottom surface.

6. A product with packaging, comprising:

the packaging of claim **3**; and

the product retained by the movable anchor and the fixed anchor.

7. The product with packaging of claim **6**, wherein the fixed anchor and movable anchor together provide a tensile retention force on the product.

8. The product with packaging of claim **6**, wherein the fixed anchor and the movable anchor together provide a compressive retention force on the product.

9. The product with packaging of claim **6**, wherein the fixed anchor and the movable anchor together provide a torsional force on the product.

10. The product with packaging of claim **6**, wherein the movable anchor includes a surface shaped to engage a complementary-shaped surface of a product in a retention configuration.

11. The packaging of claim **3**, wherein the movable anchor is hollow, and wherein the paper spring is disposed within the movable anchor.

12. The packaging of claim **3**, wherein each of the packaging, anchors, and paper spring is constructed entirely from paper.

13. The packaging of claim **3**, wherein the movable anchor is formed from a continuous substrate.

14. The packaging of claim **3**, wherein the paper spring is formed from a continuous substrate.

15. The packaging of claim **14**, wherein the continuous substrate is folded in a repeating v-shape.

16. The packaging of claim **3**, wherein the product is replaceable into the packaging after its removal from the packaging, with no destruction of any part of the packaging.

17. The packaging of claim **3**, further comprising a lower surface disposed below the bottom surface, the lower surface and bottom surface providing a track therebetween,

wherein the movable anchor includes wings disposed within the track such that the movable anchor slides along the track when moved.

18. Packaging formed entirely from paper, the packaging comprising:

a movable anchor; and

a paper spring coupled to the movable anchor,

wherein the paper spring and the movable anchor are movable between a first position and a second position, the second position being further from the spring's neutral position than the first position, and

wherein the paper spring and the movable anchor move automatically from the second position to the first position upon removal of a force maintaining the paper spring and the movable anchor in the first position.

19. The packaging of claim **18**, wherein motion from the second position to the first position is actuated by removal of a component of the packaging that is blocking such movement.

20. The packaging of claim **18**, wherein the packaging retains a product within the packaging when in the first position, and releases the product when in the second position.

21. The packaging of claim **18**, wherein the movable anchor includes a surface shaped to engage a complementary-shaped surface of the product in the first position.

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